Algebra 2 2.7

Identify and use parent functions

Describe transformations of functions

family of graphs

parent graph (function)

constant function

identity function

absolute value function

quadratic function

Quiz 2.5-2.6

Transformation

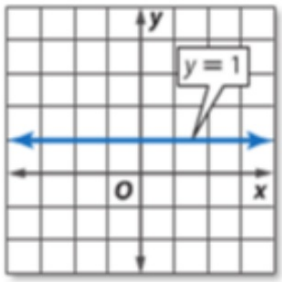
translation

reflection

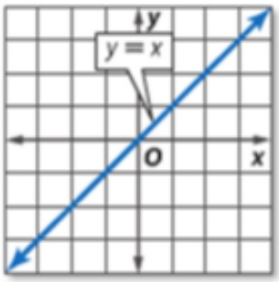
matching activity (cards) maybe Kroon says...

KeyConcept Parent Functions

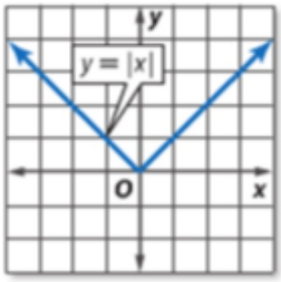
Constant Function



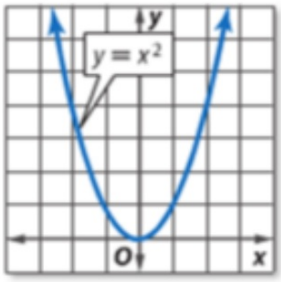
Identity Function



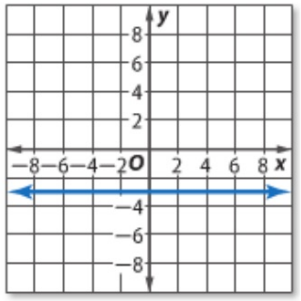
Absolute Value Function

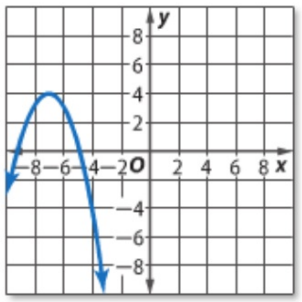


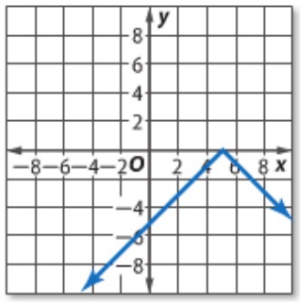
Quadratic Function

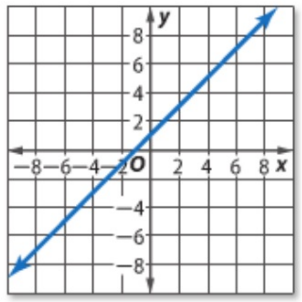


Example 1 Identify the type of function represented by each graph.

10. 

11. 

12. 

13. 

when u ask ur barber for the $y = -0.33x + 2$ but he give u that $y = -0.5(x-2)^2 + 3$

Whiteboards

$y = $ dilat.↓ $(\; - 3) + 2$ ← vert trans.

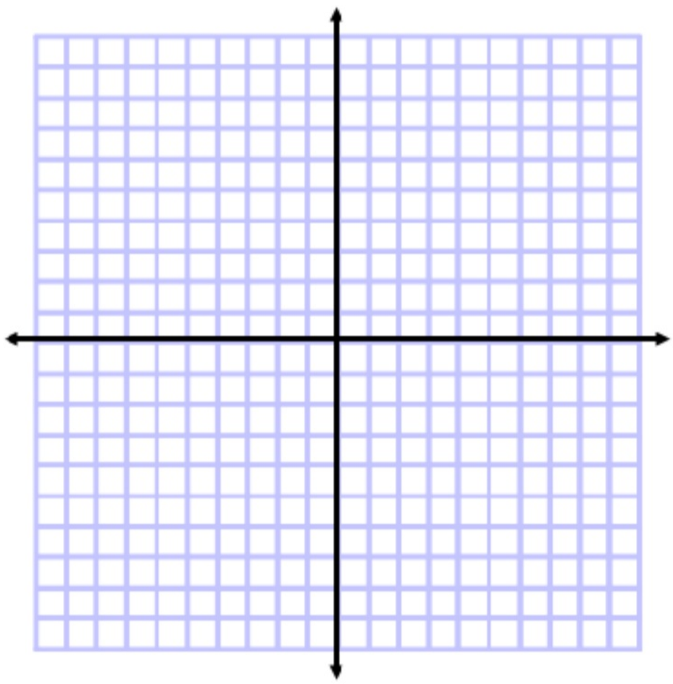
↑ horiz. (opp)

GuidedPractice

Describe the translation in each function. Then graph the function.

2A. $y = |x + 3|$

2B. $y = x^2 - 4$



Graphing calculator
Plots off
clear y=
clear home screen
Compare the graphs of the following:
y=x (parent graph)
y=2x
y=3x
y=5x

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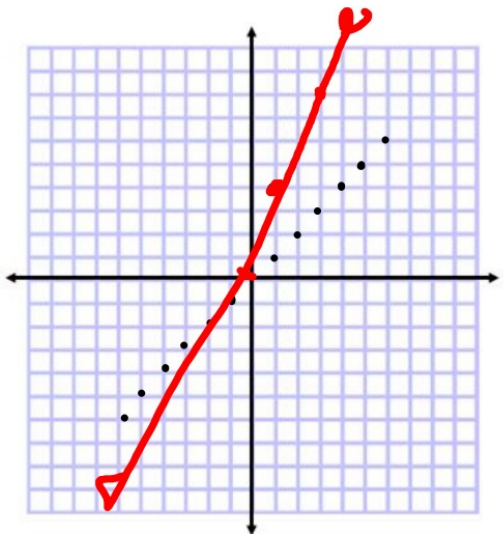
A **dilation** shrinks or enlarges a figure proportionally. When the variable in a linear parent function is multiplied by a nonzero number, the slope of the graph changes.

- When a nonlinear parent function is multiplied by a nonzero number, the function is stretched or compressed vertically.
- Coefficients greater than 1 cause the graph to be stretched vertically, and coefficients between 0 and 1 cause the graph to be compressed vertically.

Example 4 Describe and Graph Dilations

Describe the dilation in $y = 4x$. Then graph the function.

Parent graph ident. 4 x steeper



Graphing calculator: explore

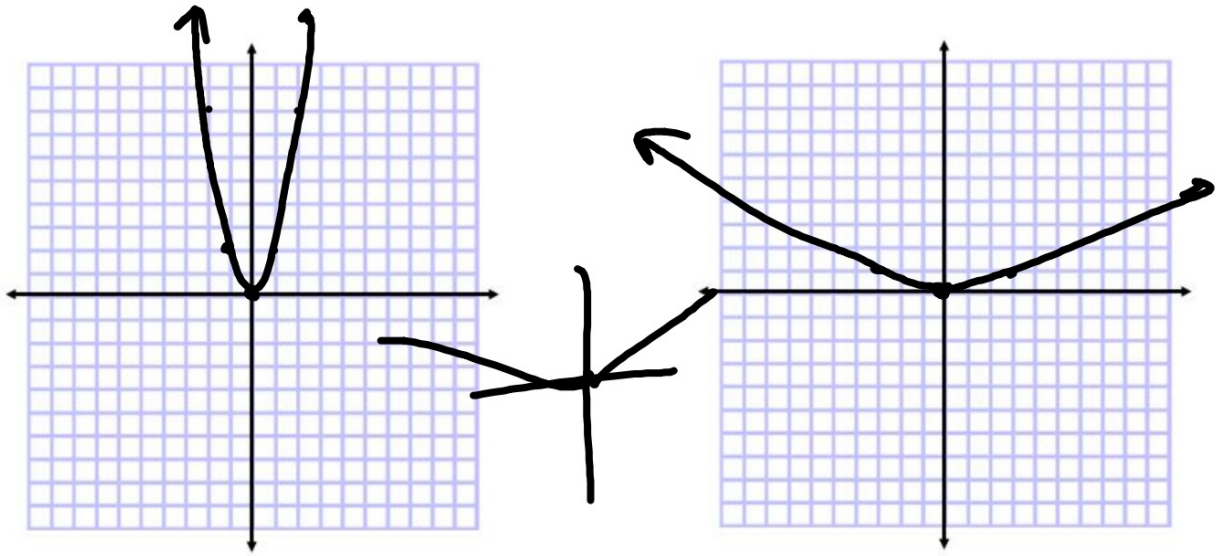
$y=x^2$

GuidedPractice

Describe the dilation in each function. Then graph the function.

4A. $y = 2x^2$

4B. $y = \left|\frac{1}{3}x\right|$



StudyTip

Regularity

Ask yourself these questions to help you identify transformations.

1. What type of function is it?
2. Does the graph open up or down?
3. Does the vertex lie on an axis?

ConceptSummary Transformations of Functions

Transformation	Change to Parent Graph
Translation	
$f(x + h), h > 0$	Translates graph h units left.
$f(x - h), h > 0$	Translates graph h units right.
$f(x) + k, k > 0$	Translates graph k units up.
$f(x) - k, k > 0$	Translates graph k units down.
Reflection	
$-f(x)$	Reflects graph in the x-axis.
$f(-x)$	Reflects graph in the y-axis.
Dilation	
$a \cdot f(x), \lvert a \rvert > 1$	Stretches graph vertically.
$a \cdot f(x), 0 < \lvert a \rvert < 1$	Compresses graph vertically
$f(bx), \lvert b \rvert > 1$	Compresses graph horizontally.
$f(bx), 0 < \lvert b \rvert < 1$	Stretches graph horizontally.

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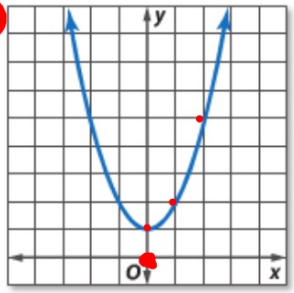
Ariel Skelley/Photographer's Choice/Getty Images

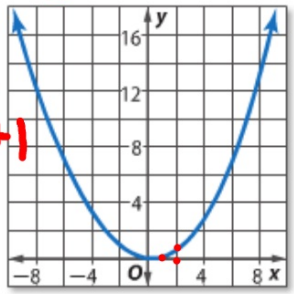
Write an equation for each function.

33.



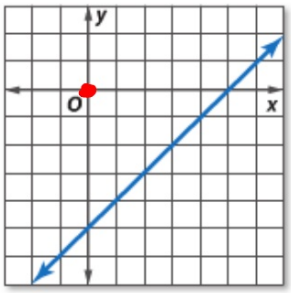
$y = (x)^2 + 1$

34.



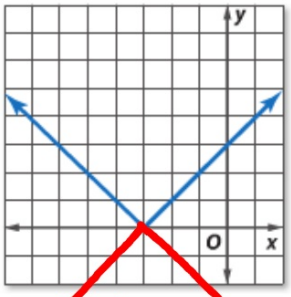
$y = \frac{1}{4}(x)^2$

35.



$y = (x) - 5$

36.

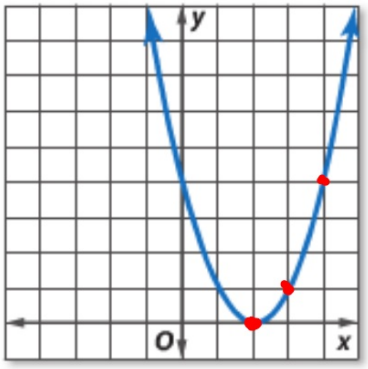


$y = -|x+3|$

Be as specific as you can:

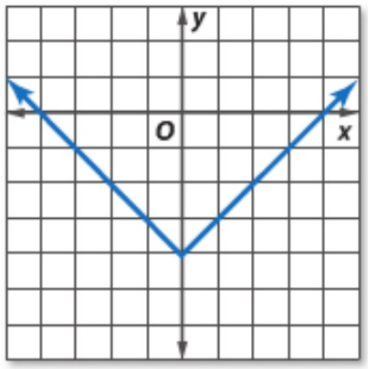
- What is the parent graph?
- Did the vertex move?
- Is there a reflection?
- Is there a dilation?

37.



$y = (x-2)^2$

38.



$y = |x| - 4$

WB 2.7 prac.